

Claims

1. A process for preparing amorphous mixtures based on crystalline active substances, in particular active substance formulations based on crystalline active substances, with the steps of
 - 5 a) complete dissolution of the active substance A) in a solvent 1, where appropriate together with a dispersing aid C) to form a solution E).
 - b) provision of a displacement agent 2, in particular a liquid 2, in which the solubility of the active substance A) is less than 1% by weight and which is miscible with solvent 1 and which effects precipitation of the active substance A), as solution F.
 - 10 c) addition of a polymer B), in particular predominantly amorphous polymers which are readily soluble in water, particularly preferably selected from the series: dextrans, dextrans, gum Arabic, polyvinyl alcohol, polyvinylpyrrolidone, polyethylene glycol, polyaspartic acid and alginates, to the solution from step a) and/or to solution F) from step b).
 - 15 d) mixing of two solvent streams of solutions E) and F), preferably in a mixing nozzle, with the two part-streams being fed continuously and uniformly to the mixing zone, where appropriate to form turbulent flow in the region of the mixing zone.
 - 20 e) removal of the solvents from the mixture by, in particular, freeze drying, spray drying or spray granulation.
2. The process as claimed in claim 1, characterized in that the mixing in step d) and, where appropriate, formation of a turbulent flow is effected by a pressure gradient across the mixing nozzle, by stirring or by ultrasound treatment of the mixed streams.
3. The process as claimed in either of claims 1 or 2, characterized in that the viscosity of solutions E) and F) is kept below 100 mPas.
- 25 4. The process as claimed in any of claims 1 to 3, characterized in that the displacement agent 2 is water or an aqueous solution of an acid, of a base or of a salt.
5. The process as claimed in any of claims 1 to 4, characterized in that the solvent 1 is a low molecular weight organic solvent, in particular one selected from the series of short-chain alcohols having 1 to 10 carbon atoms, in particular methanol, ethanol or 2-propanol, of
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- 5 short-chain glycols, in particular ethylene glycol or 1,2-propylene glycol, of ketones having 3 to 10 carbon atoms, in particular acetone, 2-butanone, carboxylic acids, in particular acetic acid, ethers, in particular diethyl ether, tetrahydrofuran or methyl tert-butyl ether, esters, in particular methyl acetate, ethyl acetate or methyl formate, heterocyclic amines, in particular pyridines, formamides, in particular dimethylformamide, or else n-methylpyrrolidone, dimethyl sulfoxide or an aqueous solution of a base or of an acid.
6. The process as claimed in any of claims 1 to 5, characterized in that the drying step e) is preceded by addition of from 10 to 30% by weight of a carrier selected from the series talc, 10 polyethylene glycol, modified starch or high molecular weight sugar, where appropriate also further polymer B), in each case based on the total weight of the formulation, to the suspension.
7. An amorphous mixture based on crystalline active substances, in particular active substance formulation, consisting at least of:
- 15 0.5 to 50% by weight, in particular 5 to 30% by weight, of an active substance A) which is usually crystalline at 50°C,
50 to 90% by weight, preferably 10 to 80% by weight, particularly preferably 15 to 75% by weight, of a polymer B), in particular selected from the series: dextrans, dextrans, gum Arabic, polyvinyl alcohol, polyvinylpyrrolidone, polyethylene glycol, polyaspartic acid
20 and alginates
and, based on the proportion of active substance A), 0.1 to 5 times, preferably 0.25 to 3 times, particularly preferably 0.5 to 2 times, of a dispersing agent C), in particular of a nonionic, anionic, cationic or zwitterionic surface-active compound,
characterized in that the mixture comprises homogeneous primary particles of a mixture of
25 the substances A), B), C) having an average particle diameter of $< 5 \mu\text{m}$, preferably $< 2 \mu\text{m}$, particularly preferably $< 1 \mu\text{m}$, where more than 50% of the active substance A) therein is present in the amorphous state.
8. The active substance-containing mixture as claimed in claim 7, characterized in that the dispersing aid C) is selected from the series of products of the reaction of fatty acids, fatty
30 acid esters, fatty alcohols, fatty amines, alkylphenols or alkylarylphenols with ethylene oxide and/or propylene oxide, and their sulfuric esters, phosphoric acid, monoesters and phosphoric diesters, products of the reaction of ethylene oxide with propylene oxide alkylsulfonates, alkyl sulfates, aryl sulfates, alkylaryl sulfates, alkyl ether sulfates, alkylaryl ether sulfates, tetraalkylammonium halides, trialkylaryl ammonium halides,

alkylaryl ethoxylate, sorbitan ethoxylates and alkylamine sulfonates alone or in any mixture.

9. The active substance-containing mixture as claimed in either of claims 7 or 8, characterized in that the active substance is selected from the series of crop protection agents preferably of herbicides, fungicides, insecticides, acaricides, nematocides, bird repellents, plant nutrients and soil conditioners, particularly preferably bistrifluron, foramsulfuron, mesosulfuron-methyl, pyraclostrobin, pyriftalid, abamectin, AC 94,377, acequinocyl, acibenzolar-S-methyl, aclonifen, acrinathrin, AKH-7088, amidosulfuron, amitraz, anilofos, anthraquinone, atrazine, azafenidin, azinphos-methyl, azocyclotin, azoxystrobin, beflubutamid, benalaxyl, benazolin-ethyl, benfluralin, benomyl, benoxacor, bensulfuron-methyl, bensultap, benzobicyclon, benzofenap, benzoximate, bifenazate, bifenox, bifenthrin, bitertanol, brodifacoum, bromadiolone, bromethalin, bromobutide, bromopropylate, bromuconazole, bupirimate, buprofezin, butafenacil, butralin, butoxydim, cafenstrole, captafol, captan, carbendazim, carpropamid, chinomethionat, chlorbromuron, chlordane, chlorfluazuron, chlorflurenol-methyl, chlorimuron-ethyl, chlorothalonil, chlorthal-dimethyl, chlozolate, chromafenozide, cinidon-ethyl, clodinafop-propargyl, clofentezine, clomeprop, cloquintocet-mexyl, cloransulam-methyl, copper oxychloride, copper sulfate (tribasic), coumaphos, coumatetralyl, cumyluron, cyclosulfamuron, cyfluthrin, beta-cyfluthrin, cypermethrin, alpha-cypermethrin, beta-cypermethrin, theta-cypermethrin, cyprodinil, daimuron, 2,4-DB, deltamethrin, desmedipham, diafenthiuron, dichlobenil, dichlofluanid, dichlorophen, diclocymet, diclomezine, dicloran, diclosulam, dicofol, diethofencarb, difenacoum, difenoconazole, difethialone, diflubenzuron, diflufenican, dimefuron, dimethametryn, dimethomorph, diniconazole, dinitramine, dinobuton, dinoterb, diphacinone, dithianon, dithiopyr, diuron, dodemorph, dodemorph acetate, emamectin benzoate, endosulfan, epoxiconazole, ergocalciferol, esfenvalerate, ethalfluralin, ethametsulfuron-methyl, ethofumesate, ethoxysulfuron, etobenzanid, etoxazole, famoxadone, fenamidone, fenarimol, fenazaquin, fenbuconazole, fenbutatin oxide, fenchlorazole-ethyl, fenclorim, fenhexamid, fenoxaprop-P-ethyl, fenoxycarb, fenpiclonil, fenpyroximate, fentin acetate, fentin hydroxide, fentrazamide, fenvalerate, fipronil, flamprop-M-isopropyl, flamprop-M-methyl, flocoumafen, fluazinam, fluazolate, fluazuron, flucycloxuron, fludioxonil, flufenoxuron, flumetralin, flumetsulam, flumiclorac-pentyl, fluoroglycofen-ethyl, fluoroimide, fluquinconazole, flurazole, flurenol-butyl, fluridone, flurochloridone, fluoxypyr-meptyl, flurtamone, flusilazole, flusulfamide, fluthiacet-methyl, flutolanil, folpet, fomesafen, halofenozide, halosulfuron-methyl, haloxyfop, haloxyfop-etotyl, gamma-HCH, heptachlor,

hexaconazole, hexaflumuron, hexythiazox, hydramethylnon, cyazofamid, imazosulfuron,
 imibenconazole, iminoctadine tris(albesilate), inabenfide, indanofan, indoxacarb, ioxynil,
 ipconazole, iprodione, iprovalicarb, isoxaben, isoxaflutole, kresoxim-methyl, lenacil,
 lufenuron, MCPA, mefenacet, mefenpyr-diethyl, mepanipyrim, mepronil, metconazole,
 5 methiocarb, methoxychlor, methoxyfenozide, metobenzuron, milbemectin, MK-616, 2-(1-
 naphthyl)acetamide, naproanilide, neburon, niclosamide, nitrothal-isopropyl, norflurazon,
 novaluron, nuarimol, oryzalin, oxabetrinil, oxadiargyl, oxadiazon, oxaziclomefone,
 ooxolinic acid, oxpoconazole fumarate, oxyfluorfen, paclobutrazol, pencycuron,
 pendimethalin, pentanochlor, pentoxazone, permethrin, phenmedipham, N-
 10 phenylphthalamic acid, phosmet, phthalide, picobenzamid, picolinafen, picoxystrobin,
 pindone, polynactins, polyoxorim, primisulfuron-methyl, procymidone, prodiamine,
 prometryn, propaquizafop, propazine, propyzamide, prosulfuron, pyraflufen-ethyl,
 pyrazolynate, pyrazophos, pyrazosulfuron-ethyl, pyribenzoxim, pyributicarb, pyridaben,
 pyrimidifen, pyriminobac-methyl, quinclorac, quinoxifen, quintozone, quizalofop-ethyl,
 15 quizalofop-P-ethyl, quizalofop-P-tefuryl, resmethrin, rimsulfuron, rotenone, siduron,
 silthiofam, simazine, spinosad, sulfluramid, sulfosulfuron, SZI-121, tebuconazole,
 tebufenozide, tebufenpyrad, tecloftalam, tecnazene, teflubenzuron, terbuthylazine,
 terbutryn, tetrachlorvinphos, tetradifon, tetramethrin, thenylchlor, thiabendazole,
 thiazopyr, thidiazuron, thifluzamide, thiodicarb, thiram, TI-35, tolclofos-methyl,
 20 tolylfluanid, tralkoxydim, tralomethrin, triadimenol, triasulfuron, triazoxide, tribenuron-
 methyl, trietazine, trifloxystrobin, triflumuron, triflusulfuron-methyl, triforine,
 triticonazole, uniconazole, uniconazole-P, vinclozolin, vitamin D3, warfarin, ziram,
 zoxamide, sulfaquinoxaline, aldrin, anilazine, barban, benodanil, benquinox, benzoylprop;
 benzoylprop-ethyl, binapacryl, bromofenoxim, bromophos, buturon, calcium cyanamide,
 25 camphechlor, chlobenthiazole, chlomethoxyfen, chlorbenside, chlorfenprop; chlorfenprop-
 methyl, chlornitrofen, chloromethiuron, chloroneb, chloropropylate, chloroxuron,
 chlorphoxim, climbazole, coumachlor, cyanofenphos, dialifos, dichlone, diclobutrazol,
 dieldrin, dienochlor, difenoxuron, dioxabenzofos, dipropetryn, drazoxolon, fenitropan,
 fenoxaprop-ethyl; fenoxaprop, fenthiaprop; fenthiaprop-ethyl, flamprop-methyl; flamprop-
 30 isopropyl; flamprop, flubenzimine, fluenetil, flumipropyn, fluorodifen, fluotrimazole,
 flupoxam, forchlorfenuron, furconazole-cis, halacrinat, isomethiozin, isoxapyrifop,
 iodfenphos, leptophos, medinoterb acetate; medinoterb, methazole, methfuroxam,
 methoxyphenone, monalide, myclozolin, naphthalene, nitratin, nitrofen, phenisopham,
 phenylmercury dimethyldithiocarbamate, quinonamid, SMY 1500, tetcyclacis, tetrasul,
 35 thidiazimin, trichlamide, 2,2,2-trichloro-1-(3,4-dichlorophenyl)ethyl acetate, trifenmorph,
 urbacid,

- or of agents for curing, alleviating or preventing diseases in humans or animals, preferably therapeutic agents for acidosis, analeptics/antihypoxemics, analgesics/antirheumatics, anthelmintics, antiallergics, antianemics, antiarrhythmics, antibiotics/antiinfectives, antidementia drugs, antidiabetics, antidotes, antiemetics/antivertigo drugs, antiepileptics, antihemorrhagics, antihypertensives, antihypoglycemics, antihypotensives, anticoagulants, antimycotics, antiparasitic agents, antiinflammatory drugs, antitussives/expectorants, arteriosclerosis drugs, bronchodilators/asthmatics, cholagoges and biliary therapeutic agents, cholinergics, corticoids, dermatologicals, diuretics, blood flow-stimulating agents, anticraving drugs/agents for the treatment of addictive disorders, enzyme inhibitors, preparations for enzyme deficiency and transport proteins, fibrinolytics, geriatric drugs, antigout drugs, gynecologicals, hepatic drugs, hypnotics/sedatives, immunomodulators, cardiac drugs, coronary agents, laxatives, lipid-lowering agents, local anesthetics/neurotherapeutic agents, gastrointestinal drugs, migraine remedies, muscle relaxants, ophthalmologicals, osteoporosis remedies/calcium metabolism regulators, otologicals, psychoactive drugs, rhinologicals/sinusitis remedies, roborants/tonics, thyroid therapeutic agents, sex hormones and their inhibitors, spasmolytics/anticholinergics, platelet aggregation inhibitors, tuberculosis drugs, stimulants, urologicals, vein therapeutic agents, vitamins, cytostatics, other antineoplastic agents and protectives, particularly preferably boldine, quinolones, felodipine, flurbiprofen, ibuprofen, ketoprofen, macrolides, nicardipine, nifedipine, nimodipine, nisoldipine, nitrendipine, norfloxacin, ofloxacin, paclitaxel, sulfonamides and tetracyclines.
10. The use of the active substance-containing mixtures as claimed in any of claims 7 to 9 for preparing active substance-containing suspensions in water or aqueous solvents as crop protection agents, especially as sprays or soil treatment agents, and for producing pharmaceutical preparations, in particular in oral dosage form.